



1

SEQUENCE LISTING

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<120> DNA ENCODING APOPTOSIS-INDUCED eIF-5A AND DHS AND A
METHOD FOR CONTROLLING APOPTOSIS

<130> 10799/13

<140> 09/909,796

<141> 2001-07-23

<160> 21

<170> PatentIn Ver. 2.1

<210> 1

<211> 1139

<212> DNA

<213> Rattus sp.

<220>

<221> CDS

<222> (33)..(494)

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gag aca gga gat gca ggg gcc tca gcc acc ttc cca atg cag tgc tca 101
Glu Thr Gly Asp Ala Gly Ala Ser Ala Thr Phe Pro Met Gln Cys Ser
10 15 20

gca tta cgt aag aat ggt ttt gtg gtg ctc aag ggc cgg cca tgt aag 149
Ala Leu Arg Lys Asn Gly Phe Val Val Leu Lys Gly Arg Pro Cys Lys
25 30 35

atc gtc gag atg tct act tcg aag act ggc aag cat ggc cat gcc aag 197
Ile Val Glu Met Ser Thr Ser Lys Thr Gly Lys His Gly His Ala Lys
40 45 50 55

gtc cat ctg gtt ggt att gat att ttt act ggg aag aaa tat gaa gat 245
Val His Leu Val Gly Ile Asp Ile Phe Thr Gly Lys Lys Tyr Glu Asp
60 65 70

atc tgc ccg tcg act cat aac atg gat gtc ccc aac atc aaa agg aat 293
Ile Cys Pro Ser Thr His Asn Met Asp Val Pro Asn Ile Lys Arg Asn
75 80 85

gat ttc cag ctg att ggc atc cag gat ggg tac cta tcc ctg ctc cag 341
Asp Phe Gln Leu Ile Gly Ile Gln Asp Gly Tyr Leu Ser Leu Leu Gln
90 95 100

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gac agt ggg gag gta cga gag gac ctt cgt ctg cct gag gga gac ctt 389
Asp Ser Gly Glu Val Arg Glu Asp Leu Arg Leu Pro Glu Gly Asp Leu
105 110 115

ggc aag gag att gag cag aag tat gac tgt gga gaa gag atc ctg atc 437
Gly Lys Glu Ile Glu Gln Lys Tyr Asp Cys Gly Glu Glu Ile Leu Ile
120 125 130 135

aca gtg ctg tcc gcc atg aca gag gag gca gct gtt gca atc aag gcc 485
Thr Val Leu Ser Ala Met Thr Glu Glu Ala Ala Val Ala Ile Lys Ala
140 145 150

atg gca aaa taactggctt ccagggtggc ggtgggtggca gcagtgatcc 534
Met Ala Lys

atgagcctac agaggccccct ccccagctc tggctggggcc cttggctgga ctcctatcca 594

atattatttga cgttttattt tggttttcct cacccttca aactgtcggg gagaccctgc 654

ccttcaccta gctcccttgg ccaggcatga gggagccatg gccttgggtga agctacctgc 714

ctcttctctc gcagccctga tgggggaaag ggagtgggta ctgcctgtgg tttaggttcc 774

cctctccctt tttcttttta attcaatttg gaatcagaaa gctgtggatt ctggcaaattg 834

gtcttgtgtc ctttataccca ctcaaaccce tctgggtcccc tgttctccat agtccttcac 894

ccccaagcac cactgacaga ctggggacca gcccccttcc ctgcctgtgt ctcttcccaa 954

acccctctat aggggtgaca agaagaggag ggggggaggg gacacgatcc ctcctcaggc 1014

atctgggaag gccttgcccc catgggcttt accctttcct gtgggctttc tccttgacac 1074

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aaaaa 1139

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<210> 2

<211> 154

<212> PRT

<213> Rattus sp.

<400> 2

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20 25 30

Leu Lys Gly Arg Pro Cys Lys Ile Val Glu Met Ser Thr Ser Lys Thr
35 40 45

Gly Lys His Gly His Ala Lys Val His Leu Val Gly Ile Asp Ile Phe
50 55 60

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Thr Gly Lys Lys Tyr Glu Asp Ile Cys Pro Ser Thr His Asn Met Asp
 65 70 75 80
 Val Pro Asn Ile Lys Arg Asn Asp Phe Gln Leu Ile Gly Ile Gln Asp
 85 90 95
 Gly Tyr Leu Ser Leu Leu Gln Asp Ser Gly Glu Val Arg Glu Asp Leu
 100 105 110
 Arg Leu Pro Glu Gly Asp Leu Gly Lys Glu Ile Glu Gln Lys Tyr Asp
 115 120 125
 Cys Gly Glu Glu Ile Leu Ile Thr Val Leu Ser Ala Met Thr Glu Glu
 130 135 140
 Ala Ala Val Ala Ile Lys Ala Met Ala Lys
 145 150

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 <211> 462
 <212> DNA
 <213> Homo sapiens

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 gtcgagatgt ctacttcgaa gactggcaag cacggccacg ccaagggtcca tctggttggg 180
 attgacatct ttactgggaa gaaatatgaa gatattctgcc cgtcaactca taatatggat 240
 gtccccaaca tcaaaaggaa tgacttccag ctgattggca tccaggatgg gtacctatca 300
 ctgctccagg acagcgggga ggtacgagag gaccttcgtc tccctgaggg agaccttggc 360
 aaggagattg agcagaagta cgactgtgga gaagagatcc tgatcacggg gctgtctgcc 420
 atgacagagg aggcagctgt tgcaatcaag gccatggcaa aa 462

<210> 4
 <211> 462
 <212> DNA
 <213> Homo sapiens

<220>
 <221> modified_base
 <222> (455)..(456)
 <223> a, t, c or g

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 gtggagatgt caacttccaa aactggaaag catggtcatg ccaagggttca ccttgttgga 180
 attgatattt tcacgggcaa aaaatatgaa gatatttgtc cttctactca caacatggat 240
 gttccaaata ttaagagaaa tgattatcaa ctgatatgca ttcaagatgg ttacctttcc 300
 ctgctgacag aaactggtga agttcgtgag gatcttaaac tgccagaagg tgaactaggc 360
 aaagaaatag agggaaaata caatgcaggt gaagatgtac aggtgtctgt catgtgtgca 420
 atgagtgaag aatatgctgt agccataaaa ccctnngcaa at 462

<210> 5
 <211> 462
 <212> DNA
 <213> Homo sapiens

<400> 5
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 gtcgagatgt ctacttcgaa gactggcaag catggccatg ccaaggtcca tctggttggc 180
 attgacattt ttactgggaa gaaatatgaa gatatctgcc cgctcgactca taatatggat 240
 gtccccaaca tcaaacggaa tgacttccag ctgattggca tccaggatgg gtacctatcc 300
 ctgctccagg acagtgggga ggtacgagag gaccttcgtc tgcctgaagg agaccttggc 360
 aaggagattg agcagaagta tgactgtgga gaagagatcc tgatcacagt gctgtctgcc 420
 atgacagagg aggcagctgt tgcaatcaag gccatggcaa aa 462

<210> 6
 <211> 606
 <212> DNA
 <213> Rattus sp.

<220>
 <221> CDS
 <222> (1)..(453)

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 1 5 10 15
 gca ctc aca gac ggc tca ctg ggt gac atg atc ttt ttc cat tcc tat 96
 Ala Leu Thr Asp Gly Ser Leu Gly Asp Met Ile Phe Phe His Ser Tyr
 20 25 30
 aaa aac cca ggc ttg gtc ctg gac atc gtt gaa gac ctg cgg ctc atc 144
 Lys Asn Pro Gly Leu Val Leu Asp Ile Val Glu Asp Leu Arg Leu Ile
 35 40 45
 aac atg cag gcc att ttc gcc aag cgc act ggg atg atc atc ctg ggt 192
 Asn Met Gln Ala Ile Phe Ala Lys Arg Thr Gly Met Ile Ile Leu Gly
 50 55 60
 gga ggc gtg gtc aag cac cac atc gcc aat gct aac ctc atg cgg aat 240
 Gly Gly Val Val Lys His His Ile Ala Asn Ala Asn Leu Met Arg Asn
 65 70 75 80
 gga gct gac tac gct gtt tat atc aac aca gcc cag gag ttt gat ggc 288
 Gly Ala Asp Tyr Ala Val Tyr Ile Asn Thr Ala Gln Glu Phe Asp Gly
 85 90 95
 tca gac tca gga gcc cgg cca gat gag gct gtc tcc tgg ggc aag atc 336
 Ser Asp Ser Gly Ala Arg Pro Asp Glu Ala Val Ser Trp Gly Lys Ile
 100 105 110
 cgg atg gat gca cag cca gta aag gtc tat gct gat gca tct ctg gtt 384
 Arg Met Asp Ala Gln Pro Val Lys Val Tyr Ala Asp Ala Ser Leu Val
 115 120 125

ttc ccc ttg ctg gtg gct gag aca ttc gcc caa aag gca gat gcc ttc 432
 Phe Pro Leu Leu Val Ala Glu Thr Phe Ala Gln Lys Ala Asp Ala Phe
 130 135 140

aga gct gag aag aat gag gac tgagcagatg ggtaaagacg gaggttctg 483
 Arg Ala Glu Lys Asn Glu Asp
 145 150

ccacaccttt atttattatt tgcataccaa cccctcctgg gccctctcct tggtcagcag 543

catcttgaga ataaatggcc tttttgttgg tttctgtaaa aaaaggactt taaaaaaaaa 603

aaa 606

<210> 7

<211> 151

<212> PRT

<213> Rattus sp.

<400> 7

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Ala Leu Thr Asp Gly Ser Leu Gly Asp Met Ile Phe Phe His Ser Tyr
 20 25 30

Lys Asn Pro Gly Leu Val Leu Asp Ile Val Glu Asp Leu Arg Leu Ile
 35 40 45

Asn Met Gln Ala Ile Phe Ala Lys Arg Thr Gly Met Ile Ile Leu Gly
 50 55 60

Gly Gly Val Val Lys His His Ile Ala Asn Ala Asn Leu Met Arg Asn
 65 70 75 80

Gly Ala Asp Tyr Ala Val Tyr Ile Asn Thr Ala Gln Glu Phe Asp Gly
 85 90 95

Ser Asp Ser Gly Ala Arg Pro Asp Glu Ala Val Ser Trp Gly Lys Ile
 100 105 110

Arg Met Asp Ala Gln Pro Val Lys Val Tyr Ala Asp Ala Ser Leu Val
 115 120 125

Phe Pro Leu Leu Val Ala Glu Thr Phe Ala Gln Lys Ala Asp Ala Phe
 130 135 140

Arg Ala Glu Lys Asn Glu Asp
 145 150

<210> 8

<211> 453

<212> DNA

<213> Homo sapiens

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 atcgttgagg acctgaggct catcaacaca caggccatct ttgccaagtg cactgggatg 180
 atcattctgg gcgggggctg ggtcaagcac cacattgcca atgccaacct catgcggaac 240
 ggggccgact acgctgttta catcaacaca gcccgaggag ttgatggctc tgactcaggt 300
 gcccgaccag acgaggctgt ctccctggggc aagatccggg tggatgcaca gcccgtaag 360
 gtctatgctg acgcctccct ggtcttcccc ctgcttgtgg ctgaaacctt tgcccagaag 420
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<210> 9
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 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<220>
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 <222> (12)
 <223> a, t, c or g

<400> 9
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<210> 10
 <211> 42
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 10
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<210> 11
 <211> 972
 <212> DNA
 <213> Rattus sp.

<220>
 <221> CDS
 <222> (1)..(327)

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 1 5 10 15
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 Asp Ile Phe Thr Gly Lys Lys Tyr Glu Asp Ile Cys Pro Ser Thr His
 20 25 30

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aac atg gat gtc ccc aac atc aaa agg aat gat ttc cag ctg att ggc 144
Asn Met Asp Val Pro Asn Ile Lys Arg Asn Asp Phe Gln Leu Ile Gly
      35              40              45

atc cag gat ggg tac cta tcc ctg ctc cag gac agt ggg gag gta cga 192
Ile Gln Asp Gly Tyr Leu Ser Leu Leu Gln Asp Ser Gly Glu Val Arg
      50              55              60

gag gac ctt cgt ctg cct gag gga gac ctt ggc aag gag att gag cag 240
Glu Asp Leu Arg Leu Pro Glu Gly Asp Leu Gly Lys Glu Ile Glu Gln
      65              70              75              80

aag tat gac tgt gga gaa gag atc ctg atc aca gtg ctg tcc gcc atg 288
Lys Tyr Asp Cys Gly Glu Glu Ile Leu Ile Thr Val Leu Ser Ala Met
      85              90              95

aca gag gag gca gct gtt gca atc aag gcc atg gca aaa taactggcct 337
Thr Glu Glu Ala Ala Val Ala Ile Lys Ala Met Ala Lys
      100              105

ccaggggtggc ggtggtggca gcagtgatcc atgagcctac agaggccct cccccagctc 397
tggtctgggcc cttggctgga ctctatcca atttattga cgttttattt tggttttcct 457
cacccttcca aactgtcggg gagaccctgc cttcaccta gctcccttgg ccaggcatga 517
gggagccatg gccttggtga agctacctgc ctcttctctc gcagccctga tgggggaaag 577
ggagtgggta ctgcctgtgg tttaggttcc cctctccctt tttcttttta attcaatttg 637
gaatcagaaa gctgtggatt ctggcaaatg gtcttgtgtc ctttatccca ctcaaaccce 697
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<210> 12
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 <212> PRT
 <213> Rattus sp.

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<400> 12
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      20              25              30

Asn Met Asp Val Pro Asn Ile Lys Arg Asn Asp Phe Gln Leu Ile Gly
      35              40              45

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Ile Gln Asp Gly Tyr Leu Ser Leu Leu Gln Asp Ser Gly Glu Val Arg
50 55 60

Glu Asp Leu Arg Leu Pro Glu Gly Asp Leu Gly Lys Glu Ile Glu Gln
65 70 75 80

Lys Tyr Asp Cys Gly Glu Glu Ile Leu Ile Thr Val Leu Ser Ala Met
85 90 95

Thr Glu Glu Ala Ala Val Ala Ile Lys Ala Met Ala Lys
100 105

<210> 13
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

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24

<210> 14
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

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<210> 15
<211> 489
<212> DNA
<213> Rattus sp.

<220>
<221> CDS
<222> (33)..(485)

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Met Ala Asp Asp Leu Asp Phe
1 5

gag aca gga gat gca ggg gcc tca gcc acc ttc cca atg cag tgc tca 101
Glu Thr Gly Asp Ala Gly Ala Ser Ala Thr Phe Pro Met Gln Cys Ser
10 15 20

gca tta cgt aag aat ggt ttt gtg gtg ctc aag ggc cgg cca tgt aag 149
 Ala Leu Arg Lys Asn Gly Phe Val Val Leu Lys Gly Arg Pro Cys Lys
 25 30 35
 atc gtc gag atg tct act tcg aag act ggc aag cat ggc cat gcc aag 197
 Ile Val Glu Met Ser Thr Ser Lys Thr Gly Lys His Gly His Ala Lys
 40 45 50 55
 gtc cat ctg gtt ggt att gat att ttt act ggg aag aaa tat gaa gat 245
 Val His Leu Val Gly Ile Asp Ile Phe Thr Gly Lys Lys Tyr Glu Asp
 60 65 70
 atc tgc ccg tcg act cat aac atg gat gtc ccc aac atc aaa agg aat 293
 Ile Cys Pro Ser Thr His Asn Met Asp Val Pro Asn Ile Lys Arg Asn
 75 80 85
 gat ttc cag ctg att ggc atc cag gat ggg tac cta tcc ctg ctc cag 341
 Asp Phe Gln Leu Ile Gly Ile Gln Asp Gly Tyr Leu Ser Leu Leu Gln
 90 95 100
 gac agt ggg gag gta cga gag gac ctt cgt ctg cct gag gga gac ctt 389
 Asp Ser Gly Glu Val Arg Glu Asp Leu Arg Leu Pro Glu Gly Asp Leu
 105 110 115
 ggc aag gag att gag cag aag tat gac tgt gga gaa gag atc ctg atc 437
 Gly Lys Glu Ile Glu Gln Lys Tyr Asp Cys Gly Glu Glu Ile Leu Ile
 120 125 130 135
 aca gtg ctg tcc gcc atg aca gag gag gca gct gtt gca atc aag gct 485
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 140 145 150
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<210> 16
 <211> 151
 <212> PRT
 <213> Rattus sp.

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 35 40 45
 Gly Lys His Gly His Ala Lys Val His Leu Val Gly Ile Asp Ile Phe
 50 55 60
 Thr Gly Lys Lys Tyr Glu Asp Ile Cys Pro Ser Thr His Asn Met Asp
 65 70 75 80
 Val Pro Asn Ile Lys Arg Asn Asp Phe Gln Leu Ile Gly Ile Gln Asp
 85 90 95

Gly Tyr Leu Ser Leu Leu Gln Asp Ser Gly Glu Val Arg Glu Asp Leu
 100 105 110
 Arg Leu Pro Glu Gly Asp Leu Gly Lys Glu Ile Glu Gln Lys Tyr Asp
 115 120 125
 Cys Gly Glu Glu Ile Leu Ile Thr Val Leu Ser Ala Met Thr Glu Glu
 130 135 140
 Ala Ala Val Ala Ile Lys Ala
 145 150

<210> 17
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 17
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<210> 18
 <211> 42
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 18
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<210> 19
 <211> 18
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 19
 ttgaaggggt gaggaaaa 18

<210> 20
 <211> 15
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 20
ttgagtggga taaag

15

<210> 21
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 21
aatcatctgc cattttaa

18